

1804/800/205

08/113561

Benzion &
1 of 32

FIG.1A

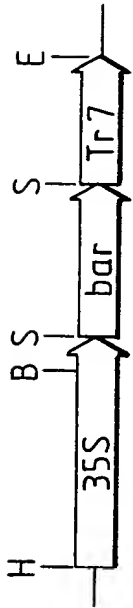


FIG.1B

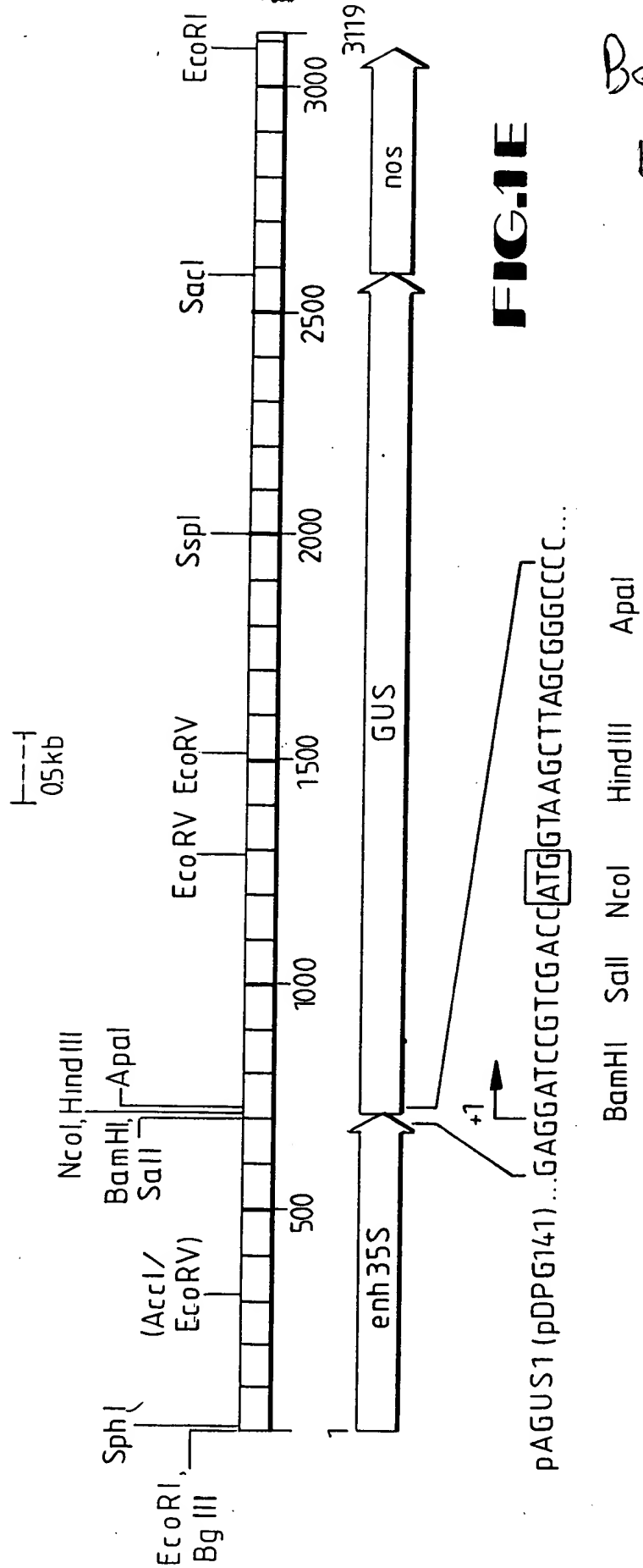
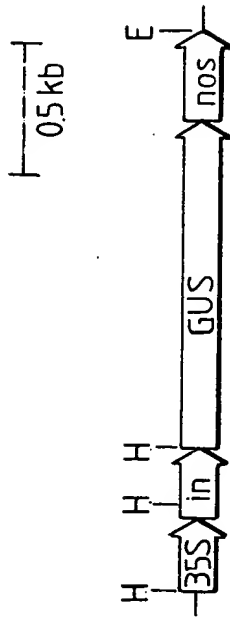


FIG.1E

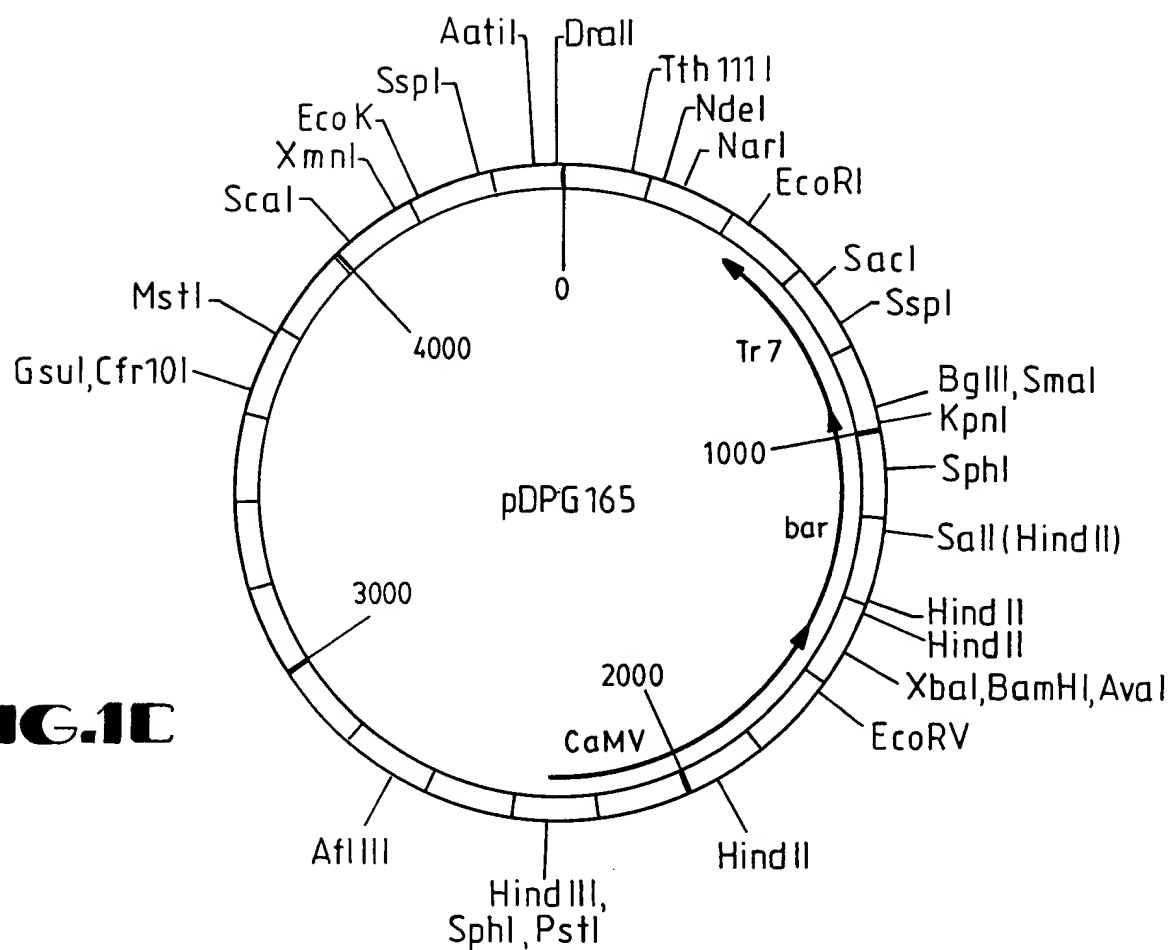
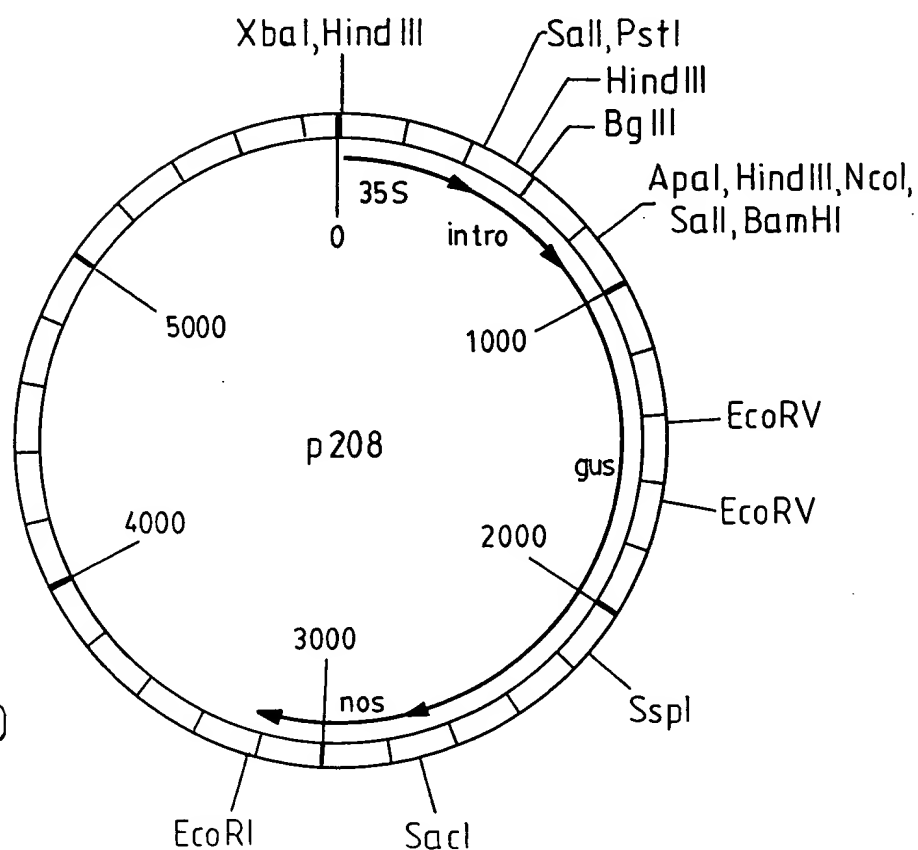
FIG.1C**FIG.1D**

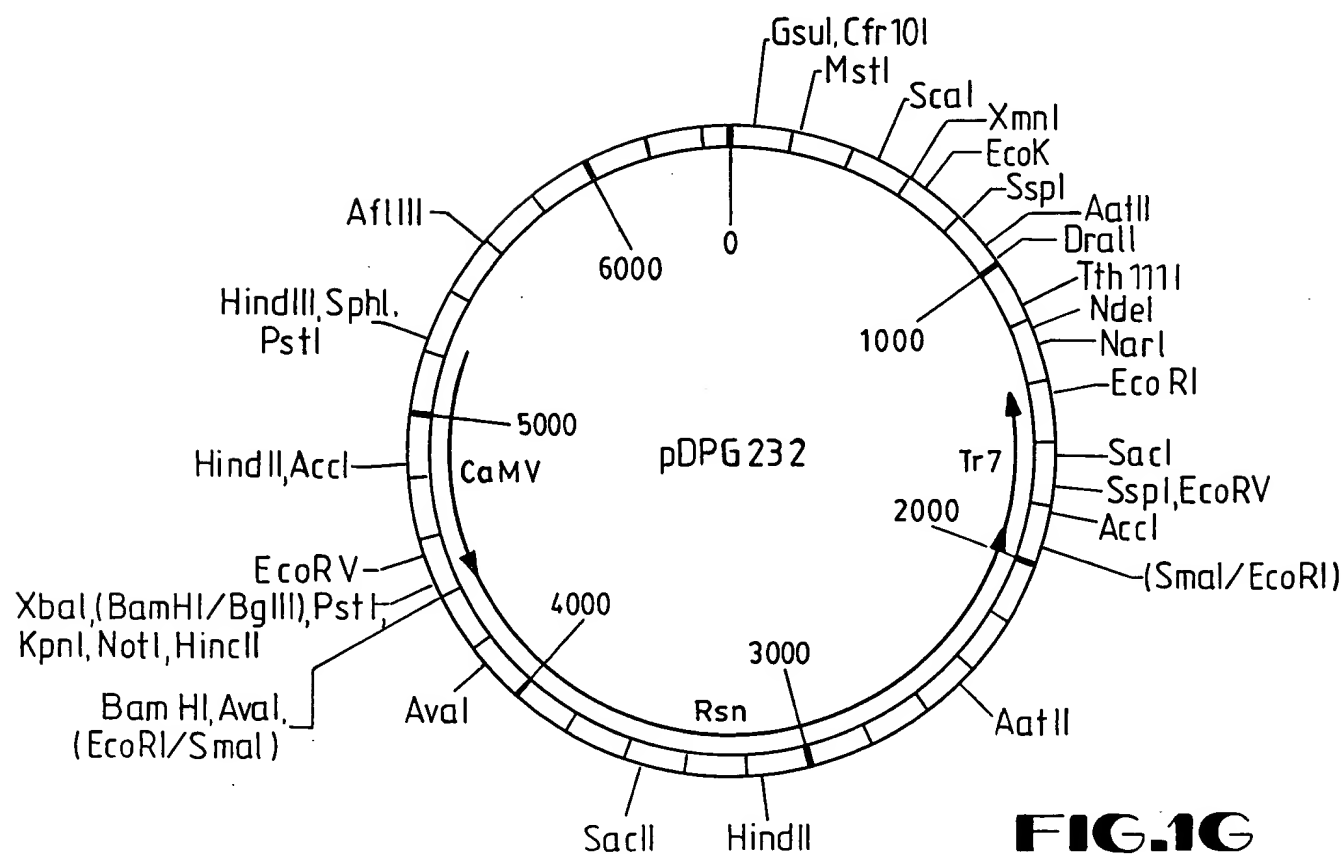
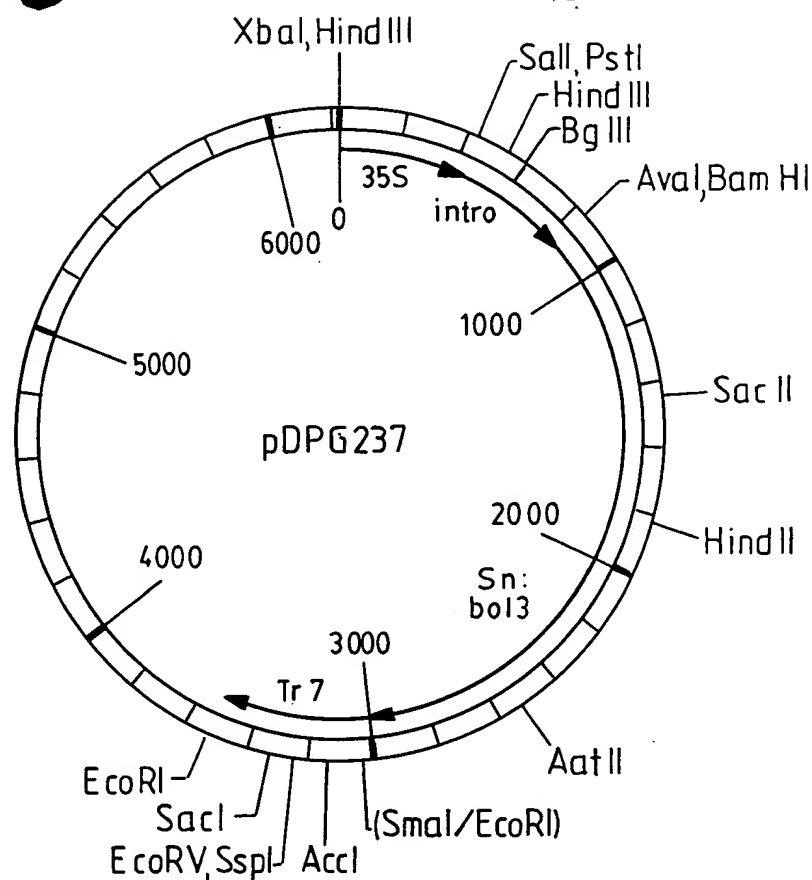
FIG.1F**FIG.1G**

FIG. 1O

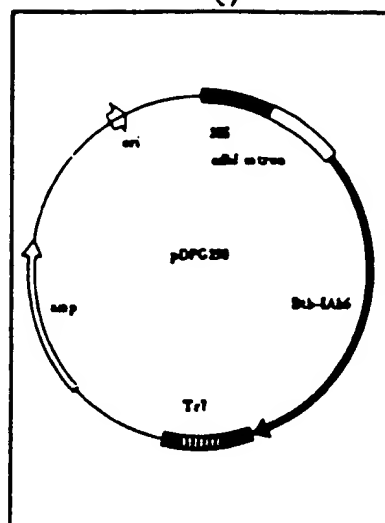


FIG. 1P

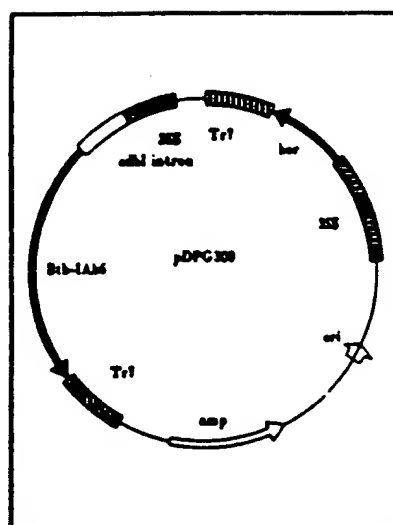


FIG. 1Q

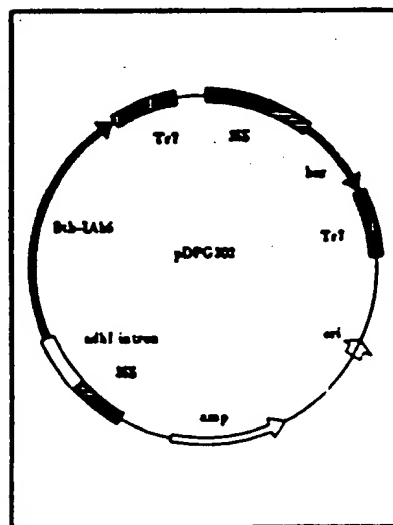
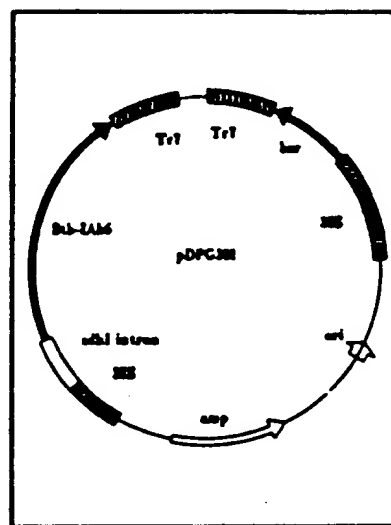


FIG. 1R

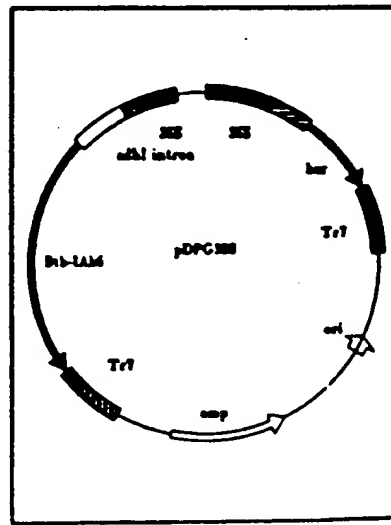


FIG. 1S

FIG. 1T

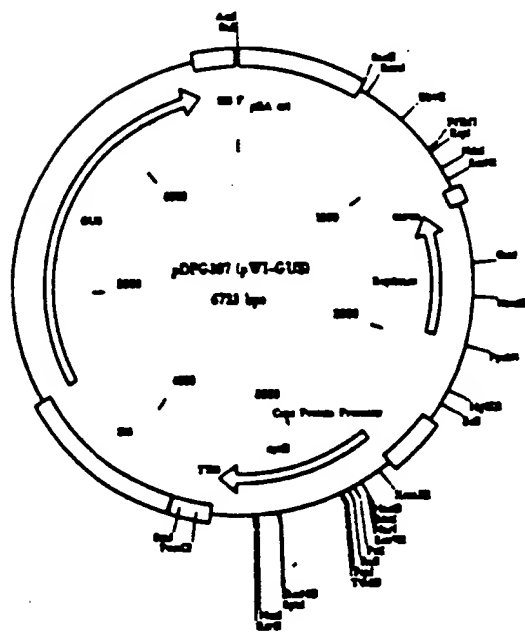
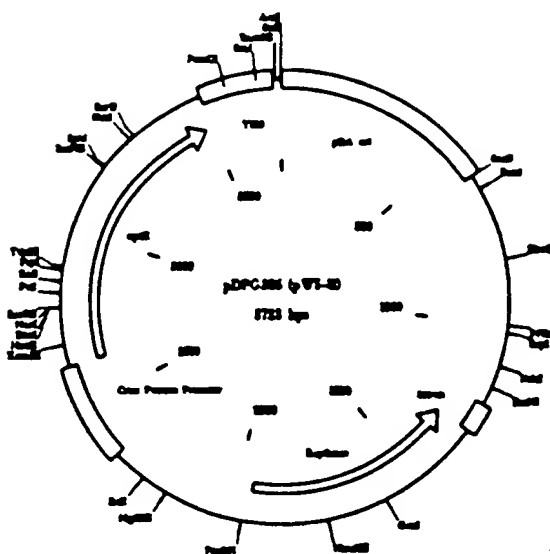


FIG. 1U

FIG. 1V

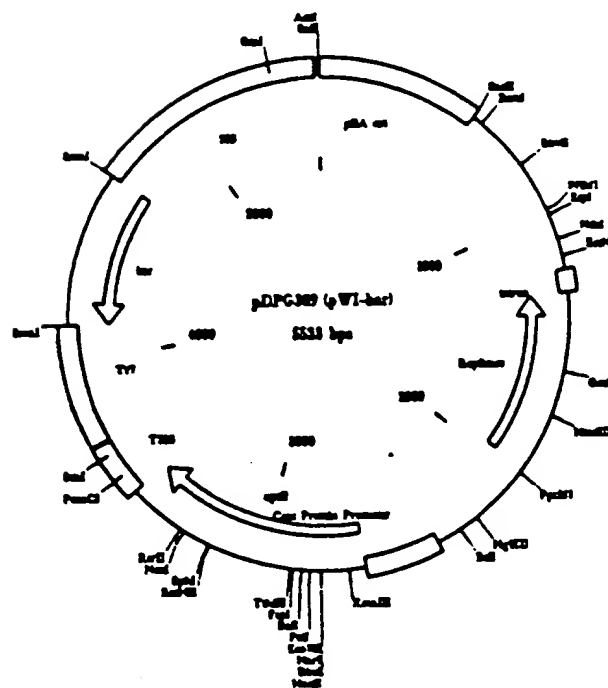
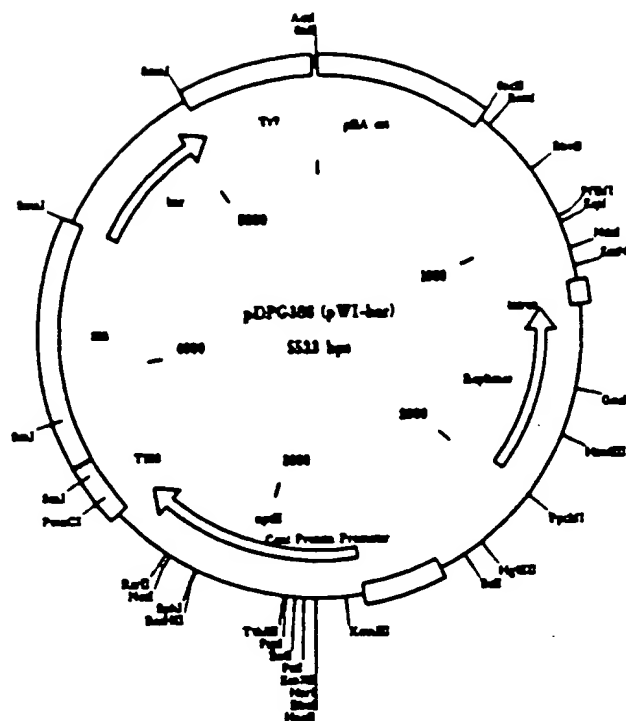


FIG. 1W

pDPG140 AKA pCEV6 AdhI pro/intron-GUS-nos 07/26/88
6582 Base Pairs

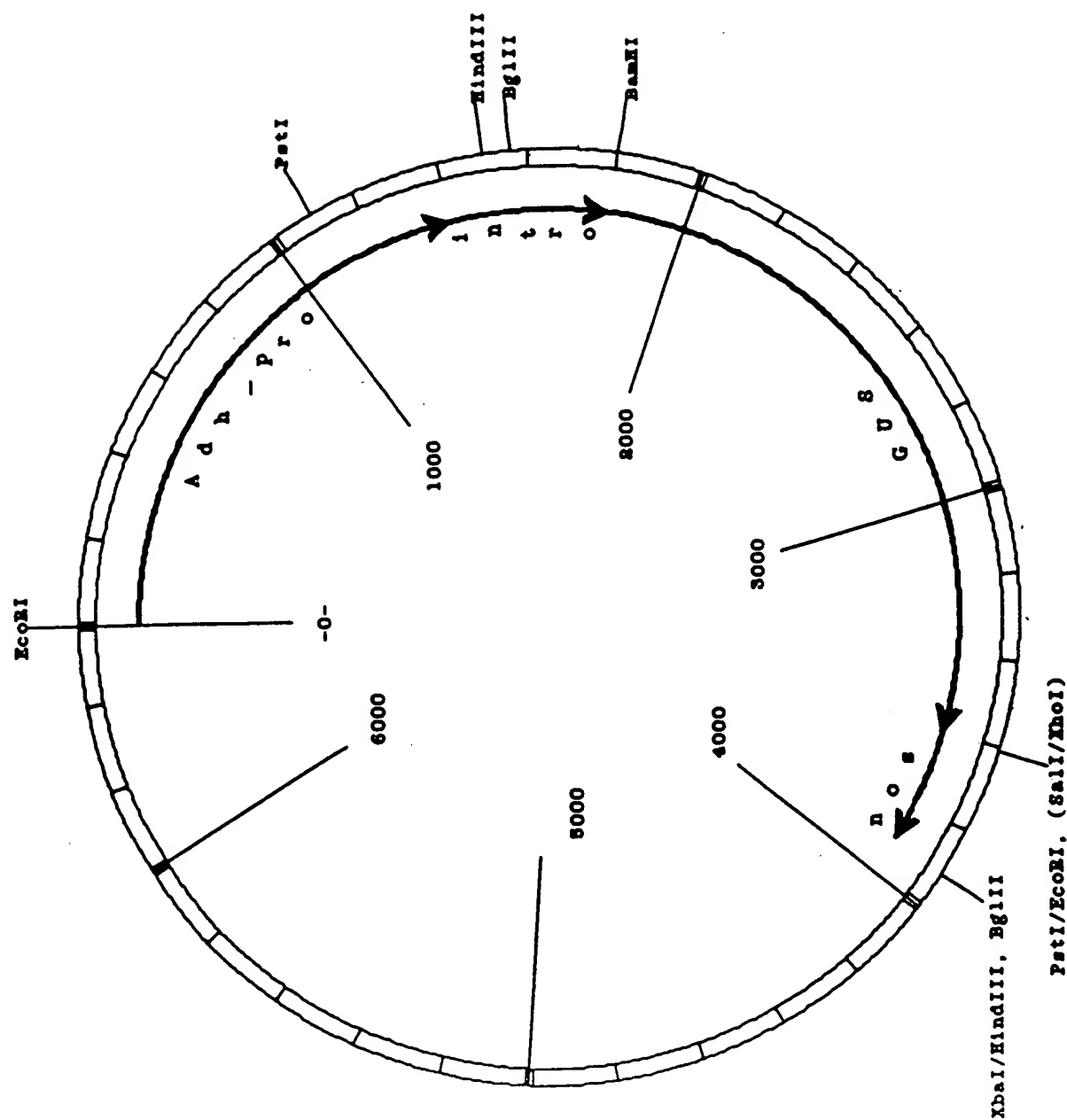


Fig. 1(X)

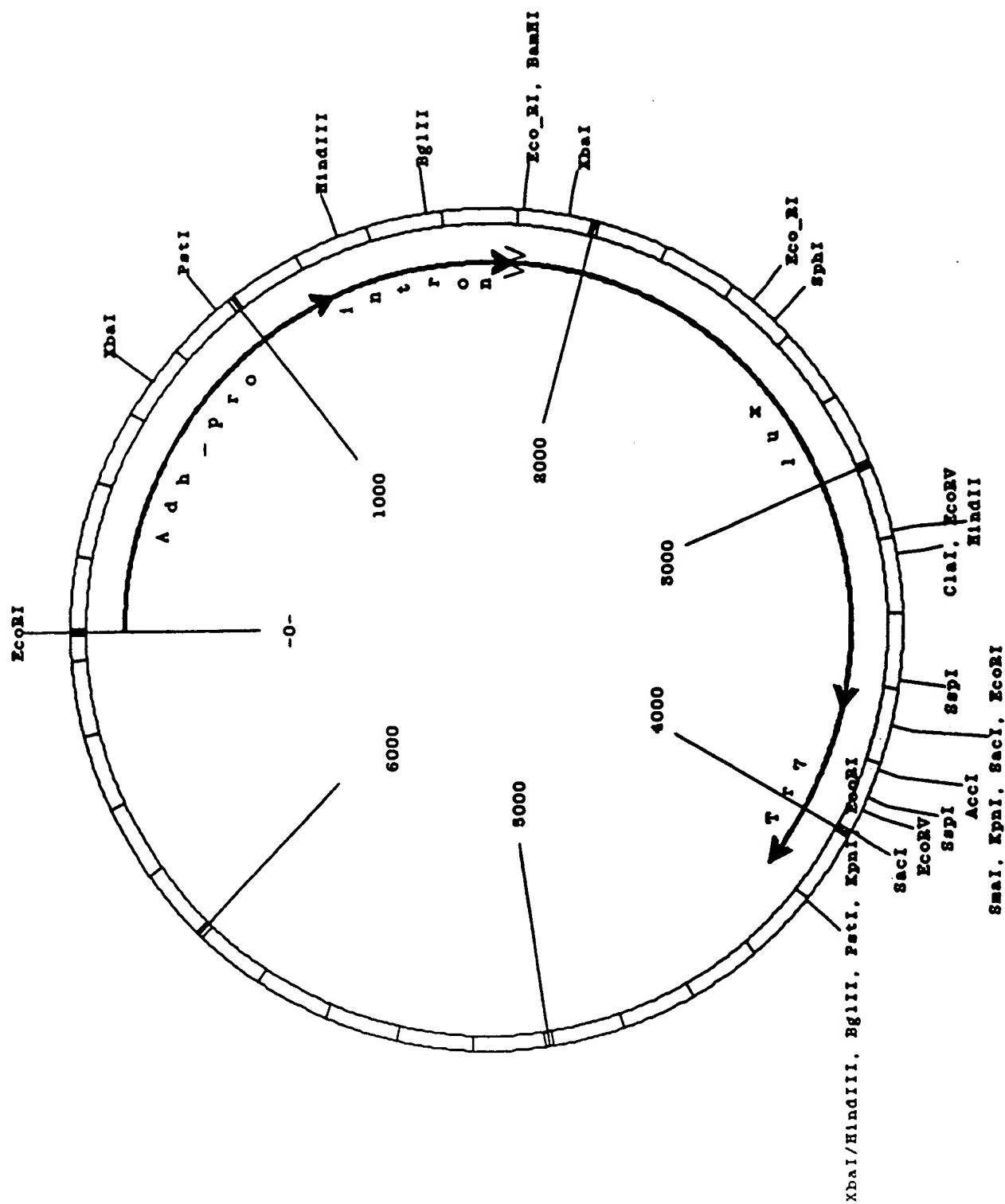


Fig. 1(Y)

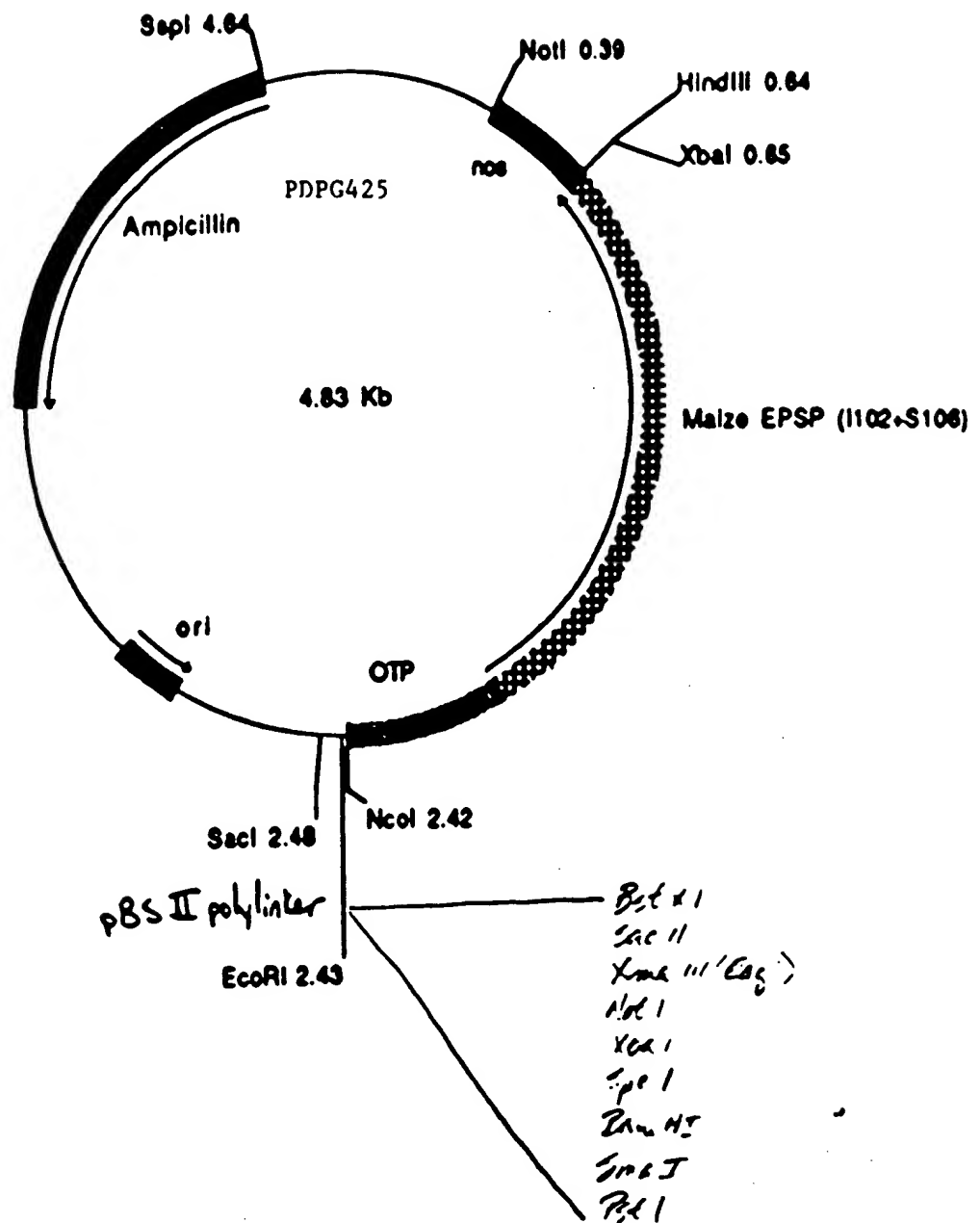


Fig. 1(Z) Schematic Representation of PDPG425

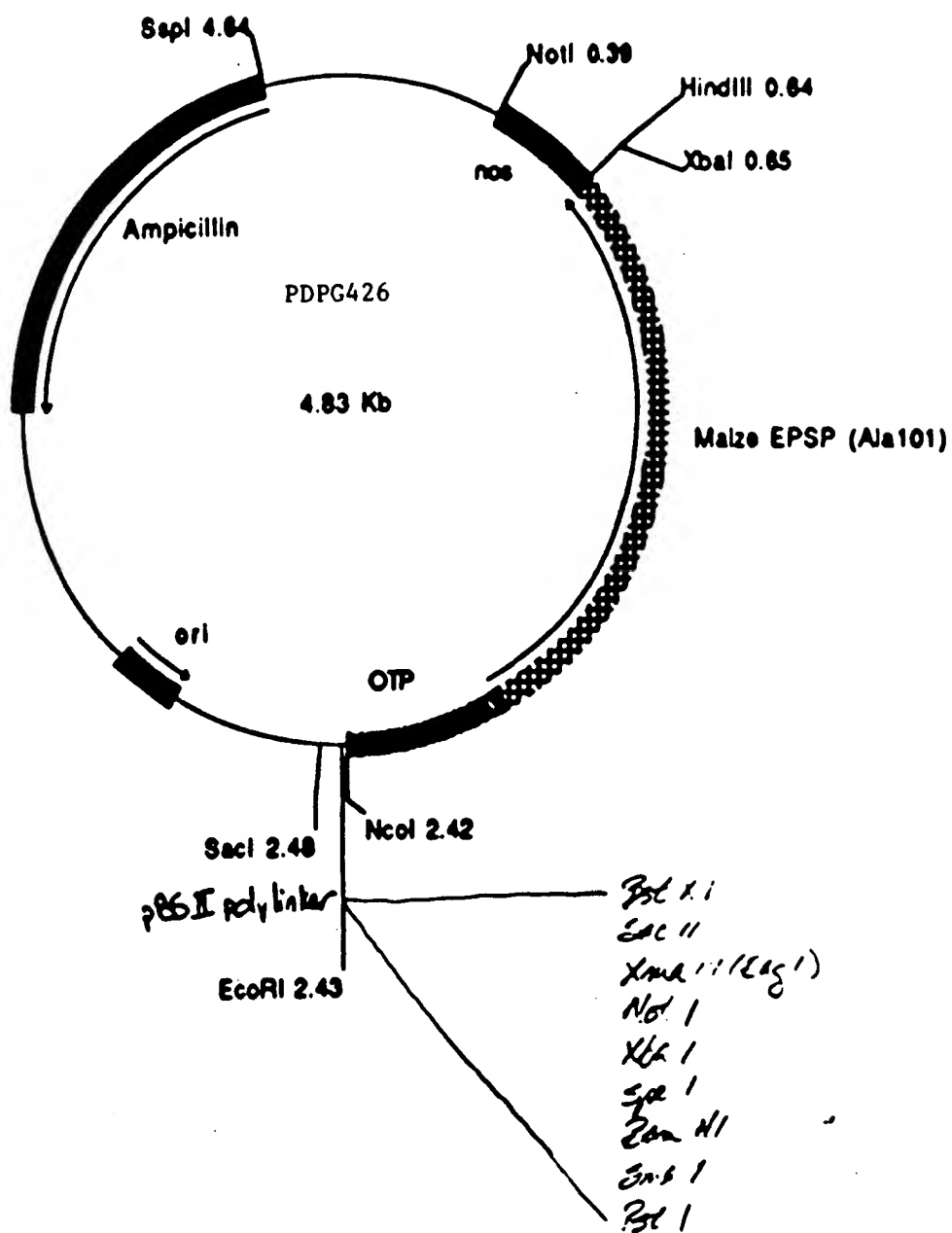


Fig. 1(AA) Schematic Representation of PDPG426

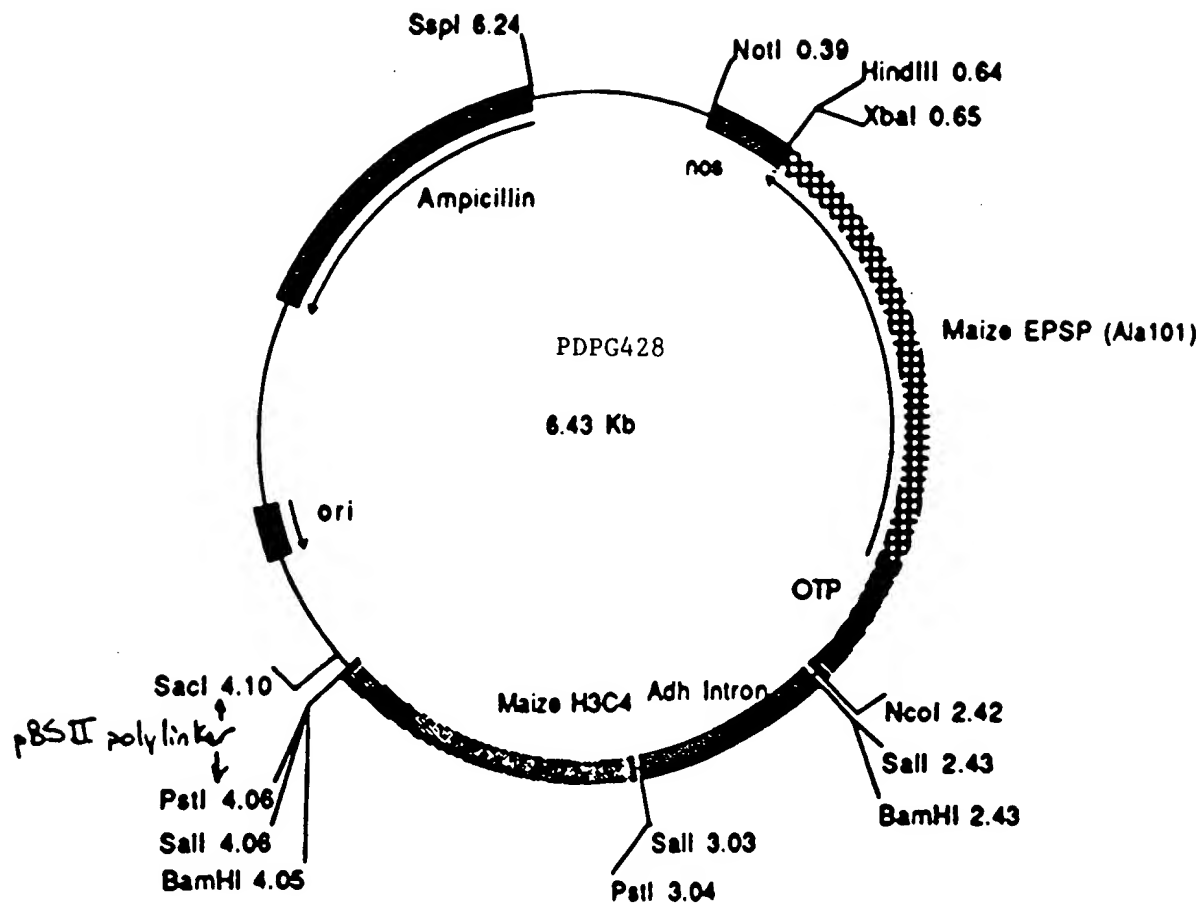


Fig. 1 (33) Schematic Representation of PDPG428

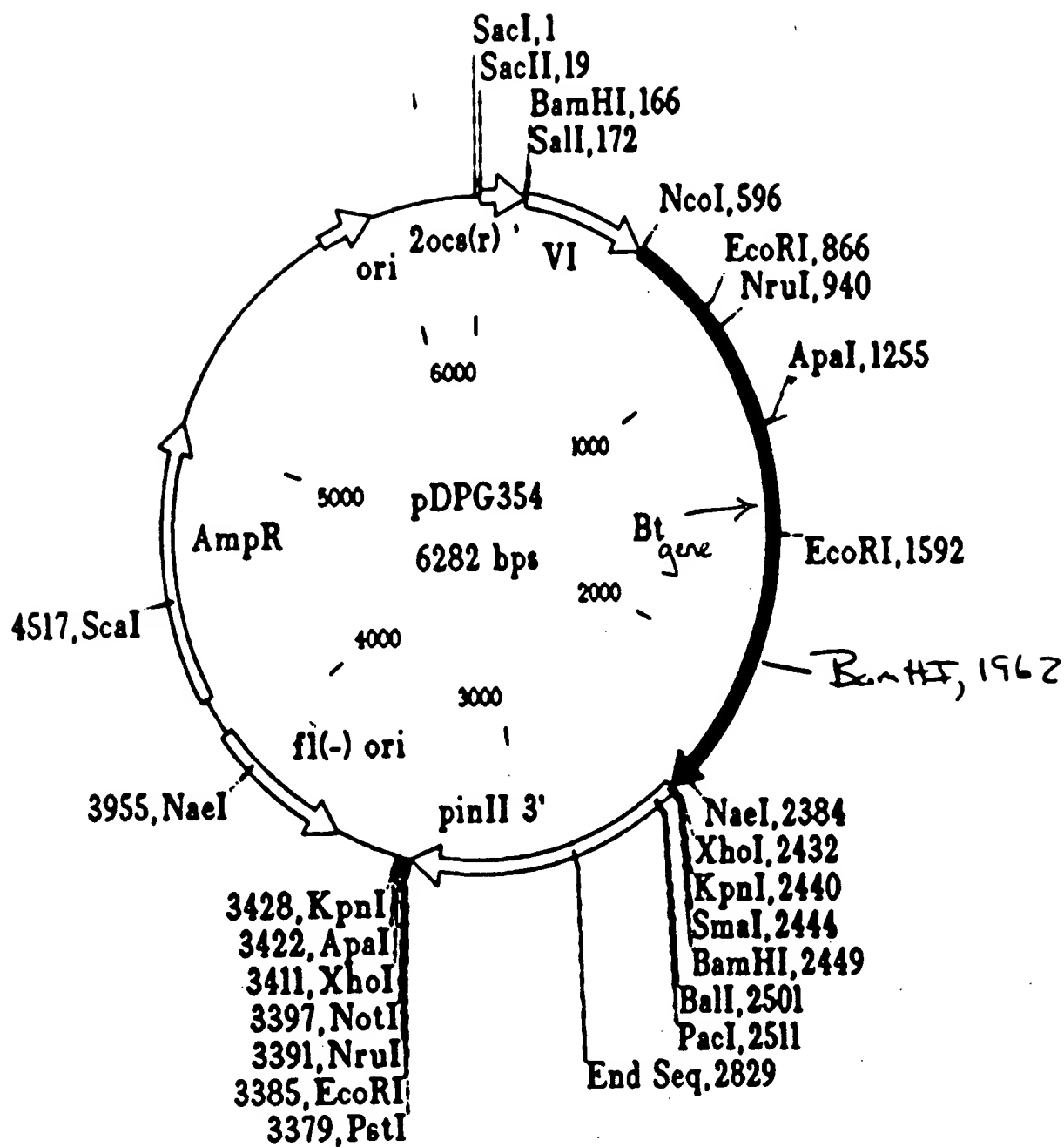


Fig. 1(CC)

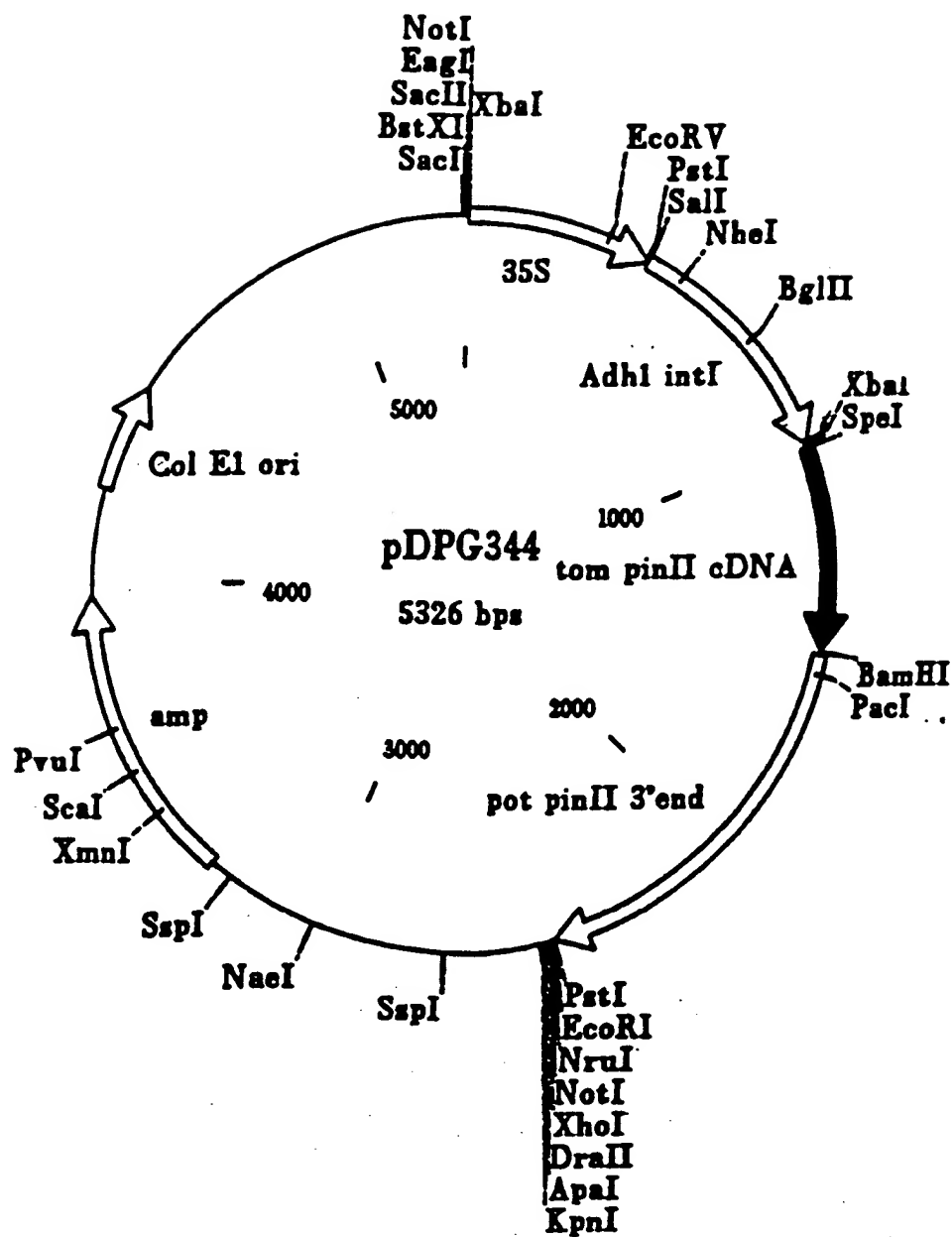


Fig. 1(DD)

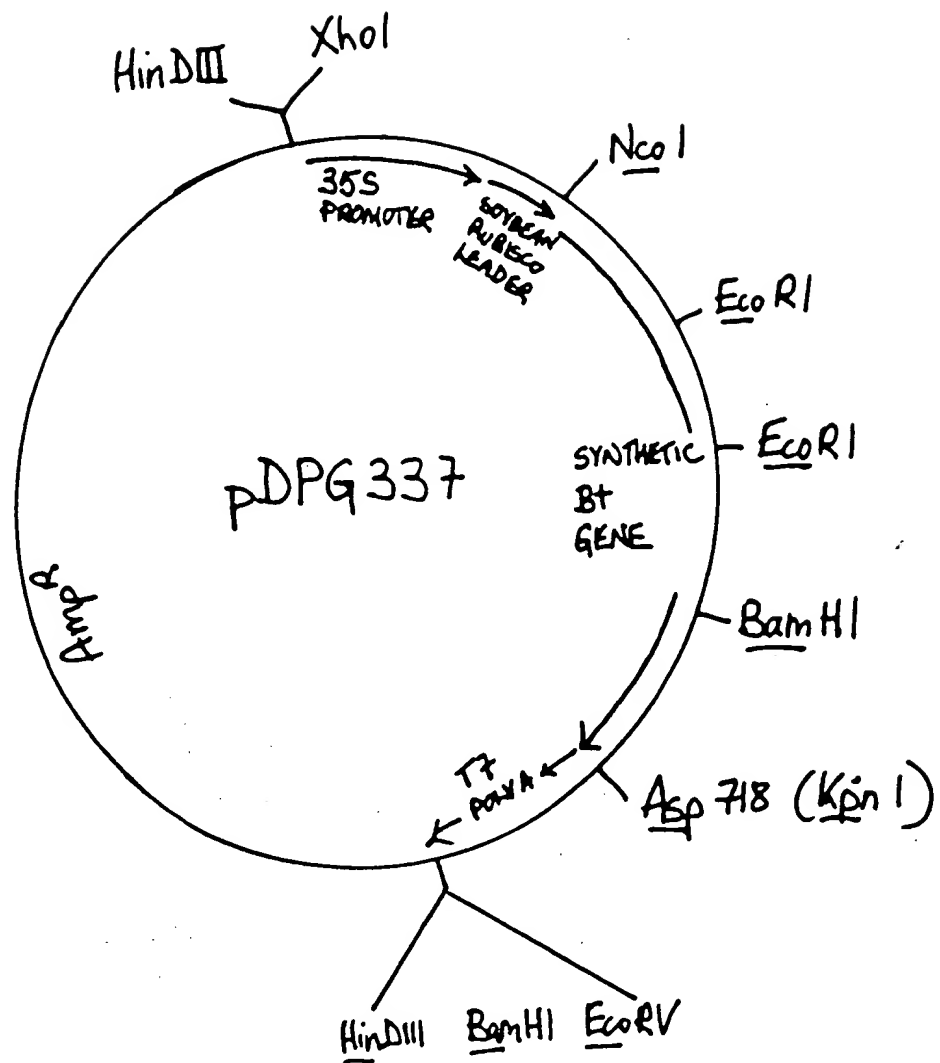


Fig. 1(c) Plasmid map of PDPG337

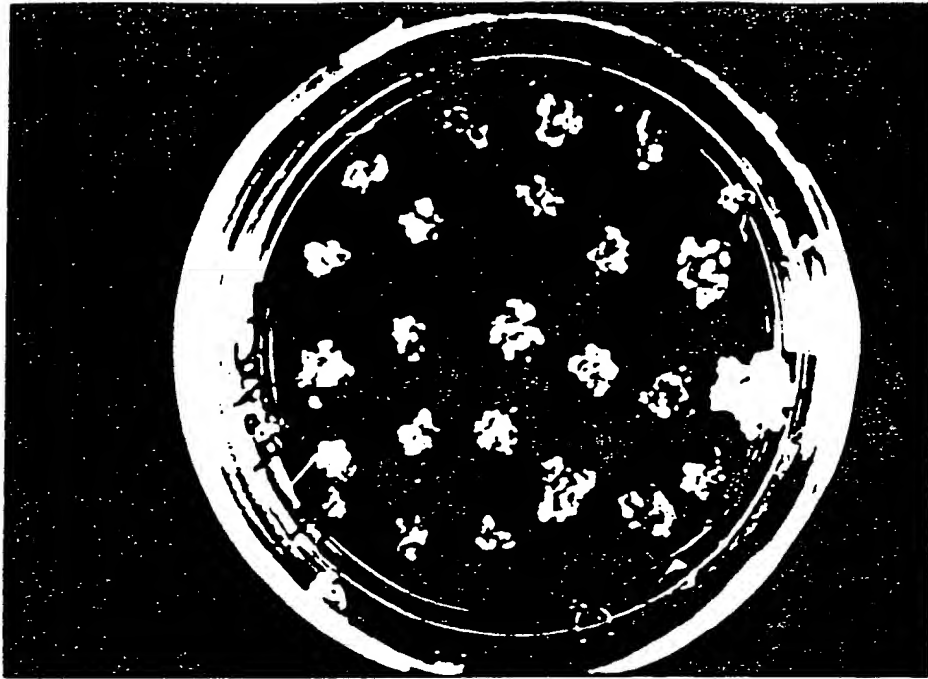


FIG. 2A



FIG. 2B

FIG.3

E1 E2 E3 E4 E5 E6 E7 E8 E9 E10 E11 E0 B13



FIG.4

MW(kb) E2 E4 E1 E3 E5 E6 E7 E8 E9 E10 E11 E0 1COPY 5COPIES MW(kb)

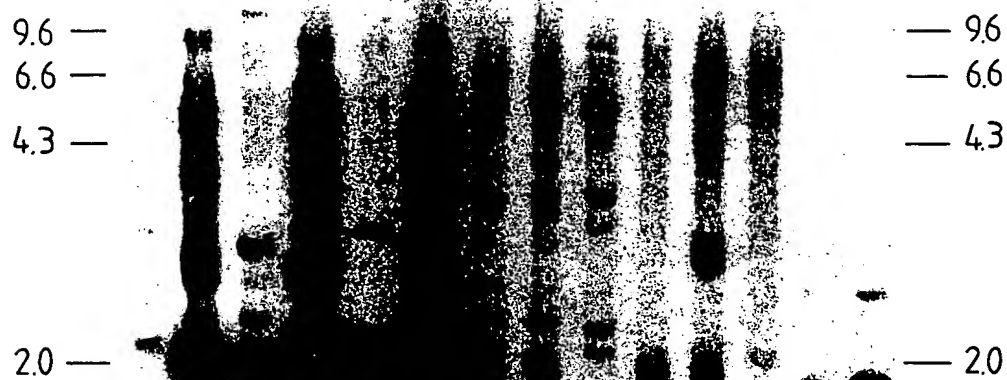


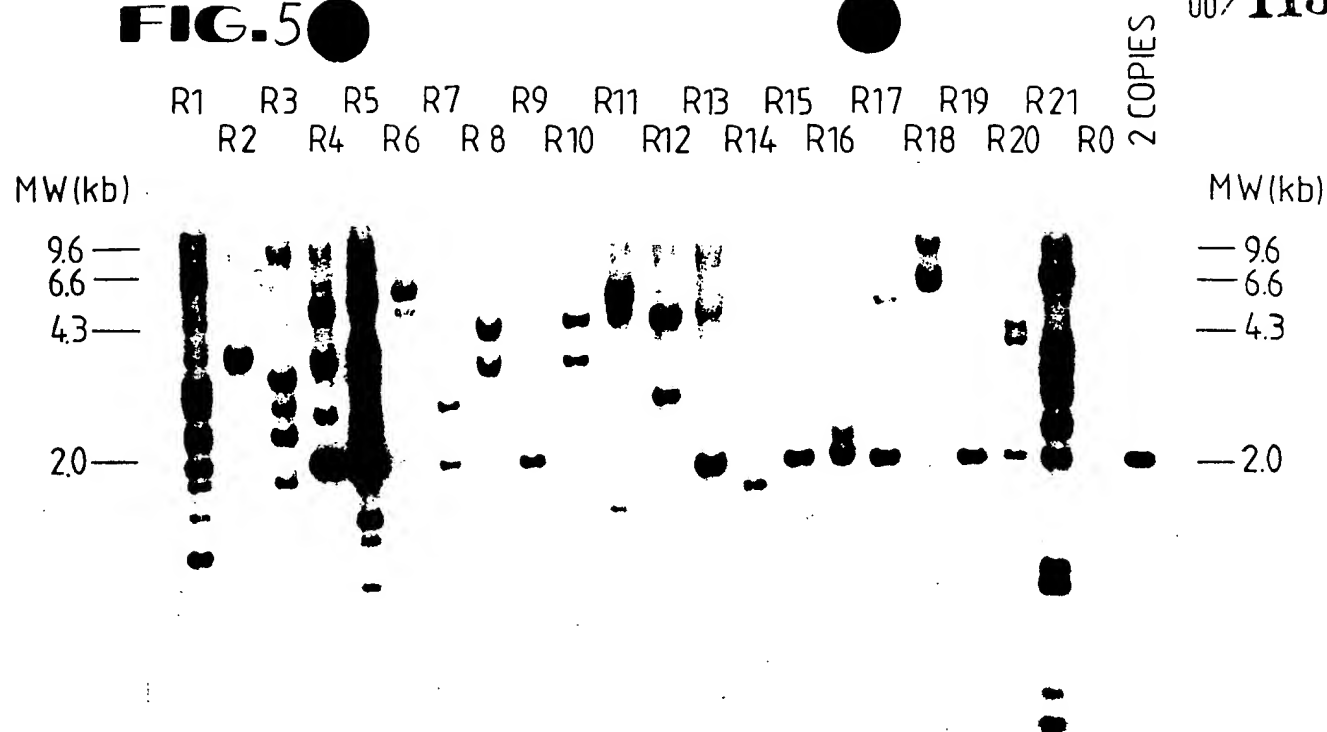
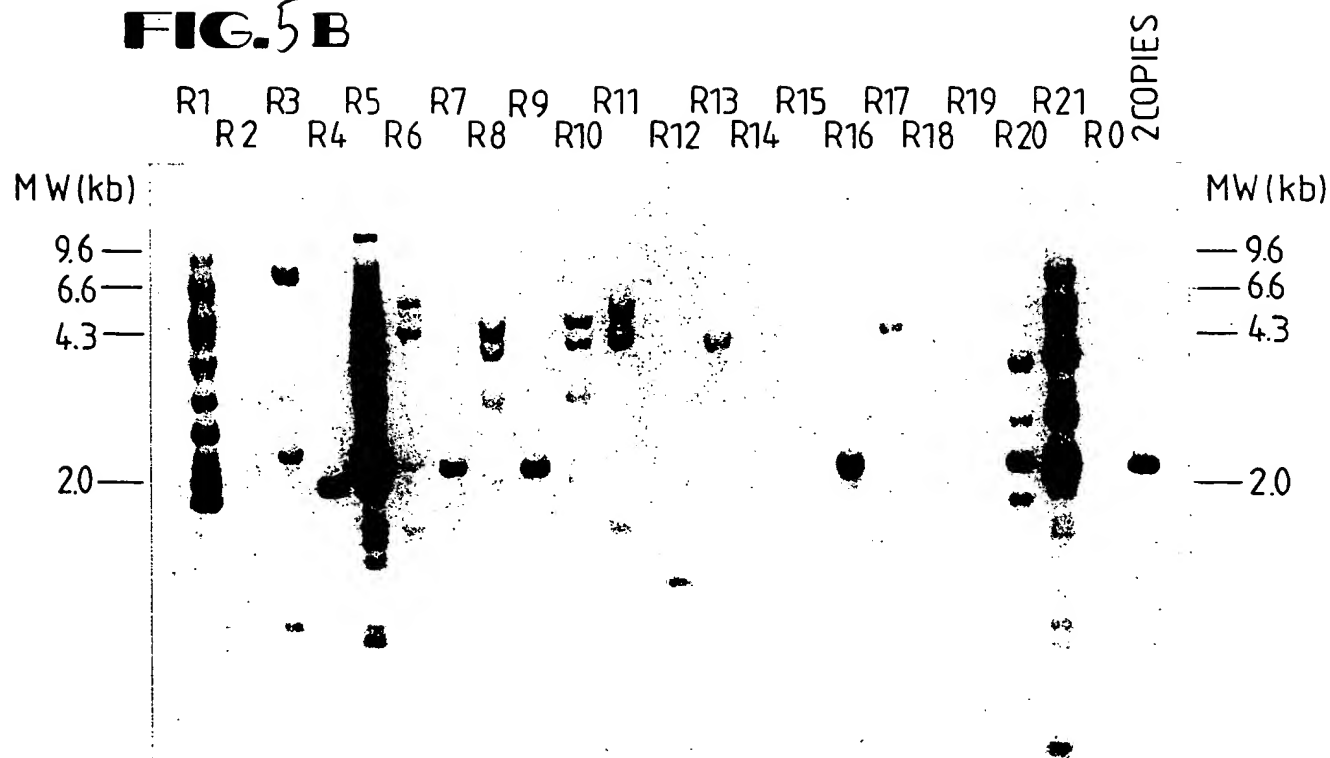
FIG.5**FIG.5 B**



Fig. 6

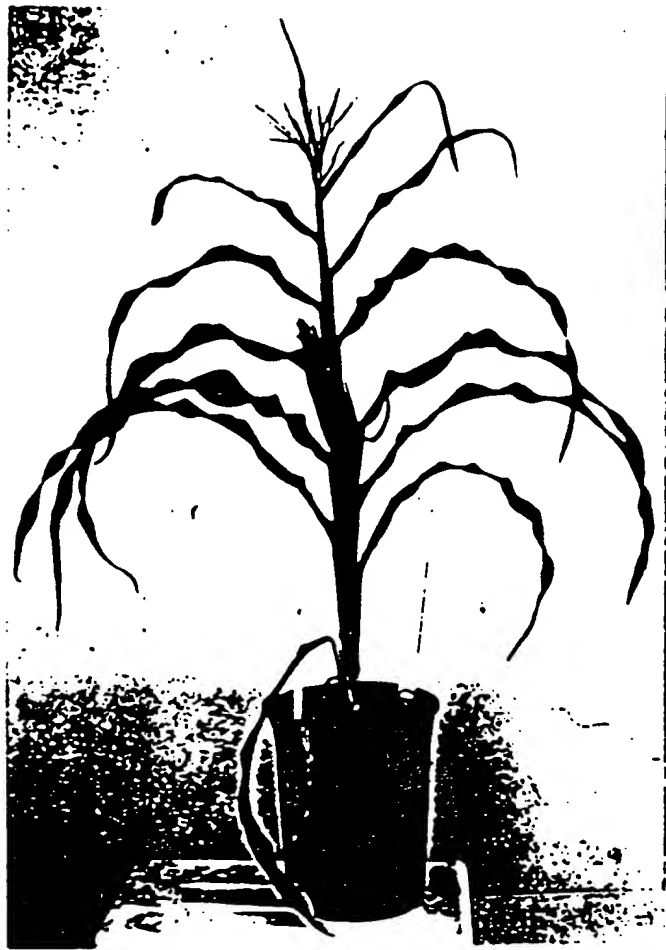


Fig. 7(A)



Fig. 7(B)

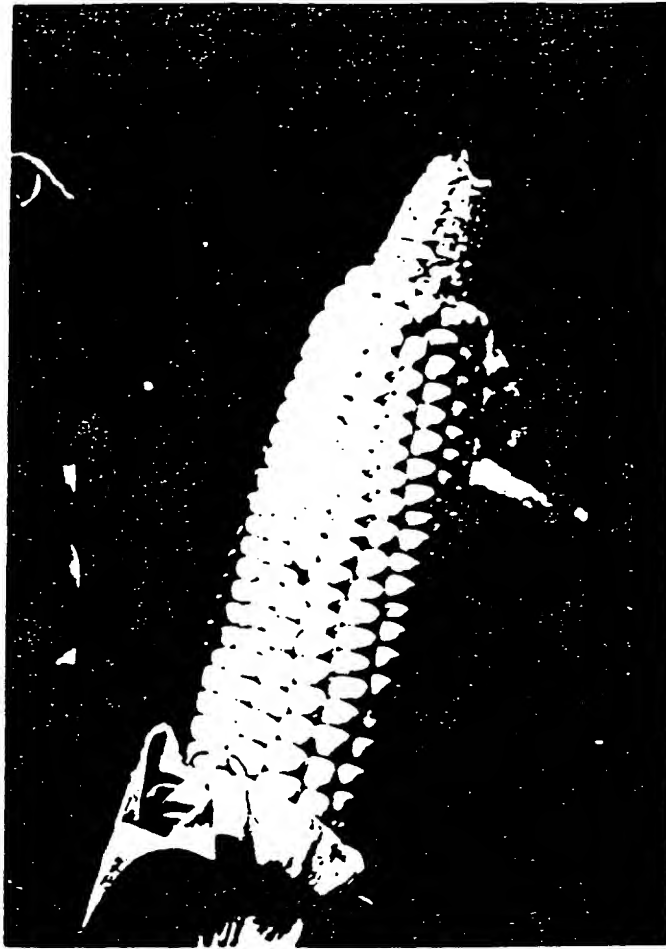


Fig. 7(C)



Fig. 7(D)



Fig. 8(A)



Fig. 8(B)

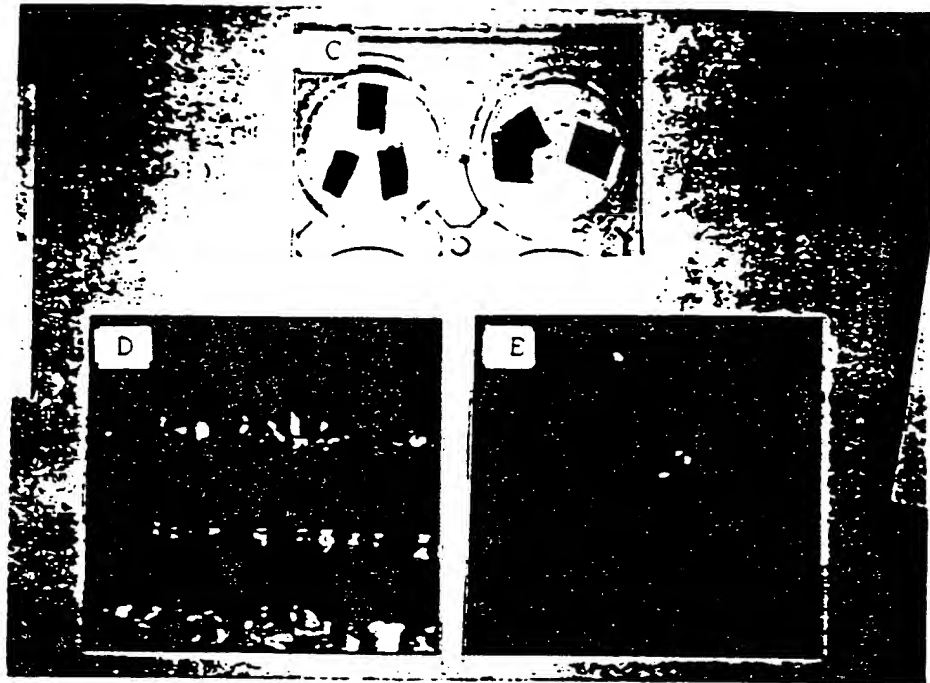


Fig. 8(C - E)

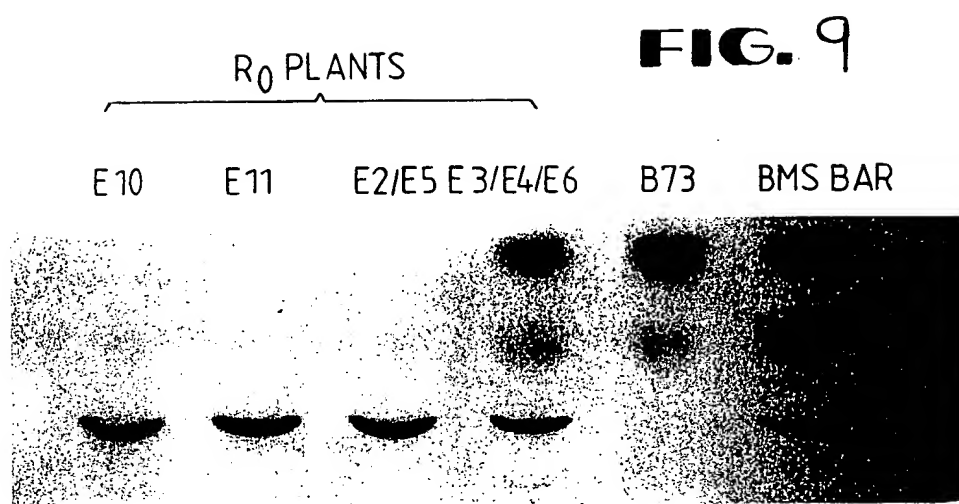
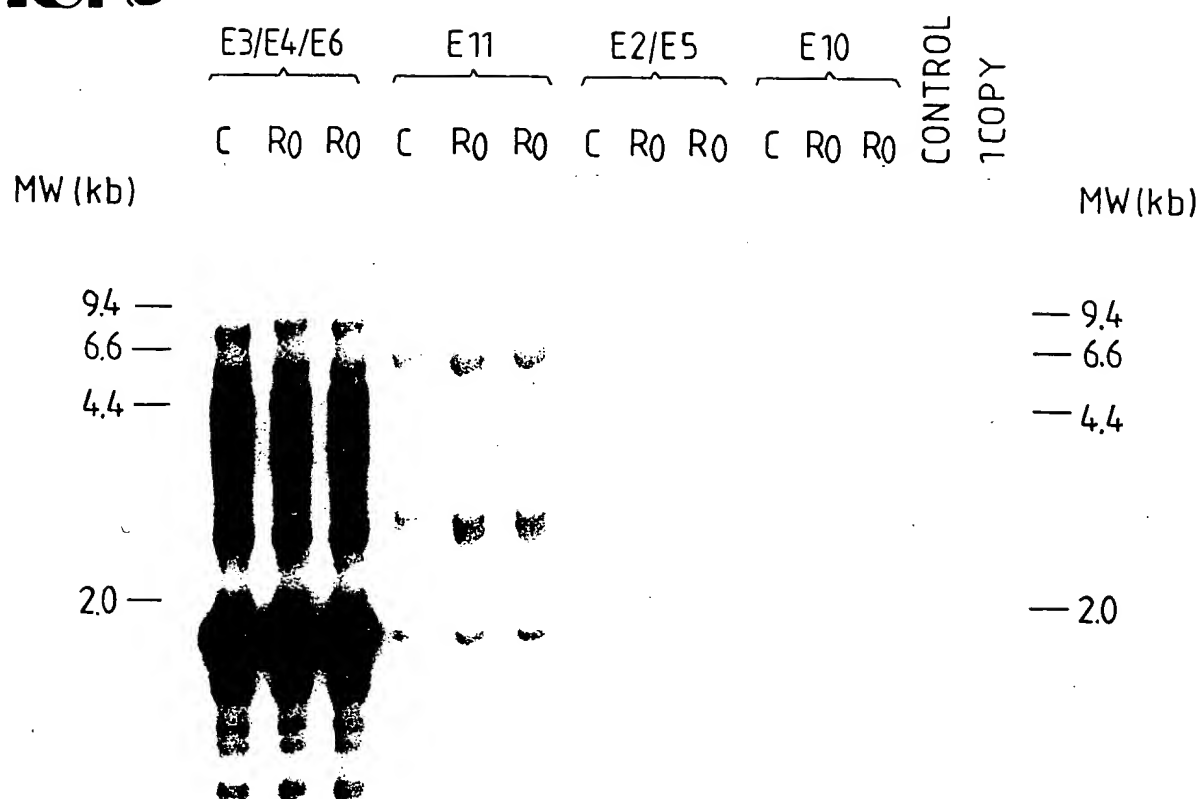


FIG. 10

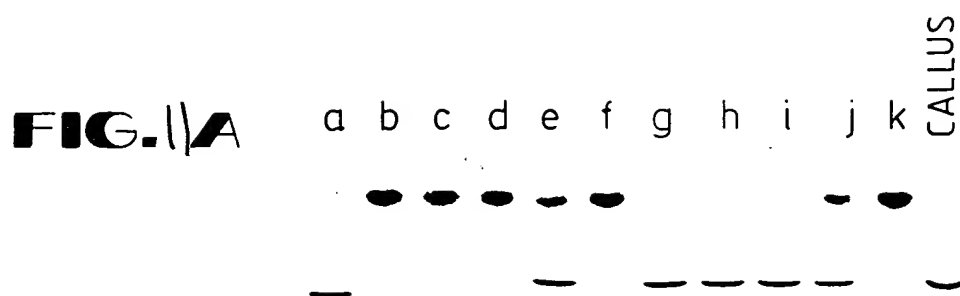


FIG. 1B

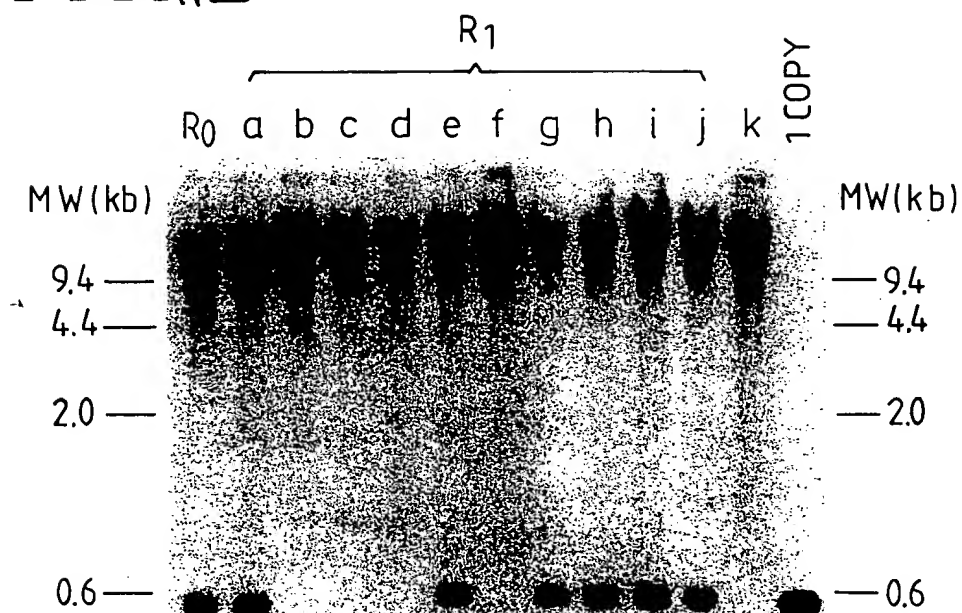


Figure 12. Nucleotide sequence of synthetic HD73 Bt gene.

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1/1                               31/11
ATG GAT AAC AAT CCG AAC ATC AAT GAA TGC ATT CCT TAC AAT TGC CTC AGC AAC CCT GAA
Met asp asn asn pro asn ile asn glu cys ile pro tyr asn cys leu ser asn pro glu
61/21                               91/31
GTG GAA GTG CTG GGT GGC GAA CGC ATC GAA ACC GGT TAC ACC CCA ATC GAT ATT TCC CTG
val glu val leu gly gly glu arg ile glu thr gly tyr thr pro ile asp ile ser leu
121/41                               151/51
TCC CTG ACC CAA TTT CTG CTG AGC GAA TTT GTG CCC GGT GCT GGC TTT GTG CTG GGC CTG
ser leu thr gln phe leu leu ser glu phe val pro gly ala gly phe val leu gly leu
181/61                               211/71
GTG GAT ATC ATC TGG GGC ATT TTT GGT CCC TCC CAA TGG GAC GCC TTT CTG GTG CAA ATT
val asp ile ile trp gly ile phe gly pro ser gln trp asp ala phe leu val gln ile
241/81                               271/91
GAA CAG CTG ATT AAC CAA CGC ATC GAA GAA TTC GCT AGG AAC CAA GCC ATT TCC CGC CTG
glu gln leu ile asn gln arg ile glu glu phe ala arg asn gln ala ile ser arg leu
301/101                               331/111
GAA GGC CTG AGC AAT CTG TAC CAA ATT TAC GCC GAA TCC TTT CGC GAG TGG GAA GCC GAT
glu gly leu ser asn leu tyr gln ile tyr ala glu ser phe arg glu trp glu ala asp
361/121                               391/131
CCT ACC AAT CCA GCC CTG CGC GAA GAG ATG CGC ATT CAA TTC AAT GAC ATG AAC AGC GCC
pro thr asn pro ala leu arg glu glu met arg ile gln phe asn asp met asn ser ala
421/141                               451/151
CTG ACC ACC GCT ATT CCT CTG TTT GCC GTG CAA AAT TAC CAA GTG CCT CTG CTG TCC GTG
leu thr thr ala ile pro leu phe ala val gln asn tyr gln val pro leu leu ser val
481/161                               511/171
TAC GTG CAA GCT GCC AAT CTG CAT CTG TCC GTG CTG CGC GAT GTG TCC GTG TTT GGC CAA
tyr val gln ala ala asn leu his leu ser val leu arg asp val ser val phe gly gln
541/181                               571/191
AGG TGG GGC TTT GAT GCC GCC ACC ATC AAT AGC CGC TAC AAT GAT CTG ACC AGG CTG ATT
arg trp gly phe asp ala ala thr ile asn ser arg tyr asn asp leu thr arg leu ile
601/201                               631/211
GGC AAC TAC ACC GAT TAC GCT GTG CGC TGG TAC AAT ACC GGC CTG GAA CGC GTG TGG GGC
gly asn tyr thr asp tyr ala val arg trp tyr asn thr gly leu glu arg val trp gly
661/221                               691/231
CCA GAT TCC CGC GAT TGG GTG AGG TAC AAT CAA TTT CGC CGC GAA CTG ACC CTG ACC GTG
pro asp ser arg asp trp val arg tyr asn gln phe arg arg glu leu thr leu thr val
721/241                               751/251
CTC GAT ATC GTG GCT CTG TTC CCA AAT TAC GAT AGC CGC CGC TAC CCA ATT CGA ACC GTG
leu asp ile val ala leu phe pro asn tyr asp ser arg arg tyr pro ile arg thr val
781/261                               811/271
TCC CAA CTG ACC CGC GAA ATT TAC ACC AAC CCA GTG CTG GAA AAT TTT GAT GGT AGC TTT
ser gln leu thr arg glu ile tyr thr asn pro val leu glu asn phe asp gly ser phe
841/281                               871/291
CGC GGC TCC GCT CAG GGC ATC GAA CGC AGC ATT AGG AGC CCA CAT CTG ATG GAT ATC CTG
arg gly ser ala gln gly ile glu arg ser ile arg ser pro his leu met asp ile leu
901/301                               931/311
AAC AGC ATC ACC ATC TAC ACC GAT GCT CAT AGG GGT TAC TAC TAC TGG TCC GGC CAT CAA
asn ser ile thr ile tyr thr asp ala his arg gly tyr tyr tyr trp ser gly his gln
961/321                               991/331
ATC ATG GCT TCC CCT GTG GGC TTT TCC GGG CCA GAA TTC ACC TTT CCA CTG TAC GGC AGC
ile met ala ser pro val gly phe ser gly pro glu phe thr phe pro leu tyr gly thr
1021/341                               1051/351
ATG GGC AAT GCC GCT CCA CAA CAA CGC ATT GTG GCT CAA CTG GGT CAG GGC GTG TAC CGC
met gly asn ala ala pro gln gln arg ile val ala gln leu gly gln gly val tyr arg
1081/361                               1111/371
ACC CTG TCC TCC ACC CTG TAC CGC CGC CCT TTT AAT ATC GGC ATC AAC AAC CAG CAA CTG
thr leu ser ser thr leu tyr arg arg pro phe asn ile gly ile asn asn gln gln leu
1141/381                               1171/391
TCC GTG CTG GAC GGC ACC GAA TTT GCT TAC GGC ACC TCC TCC AAT CTG CCA TCC GCT GTA
ser val leu asp gly thr glu phe ala tyr gly thr ser ser asn leu pro ser ala val
1201/401                               1231/411
TAC CGC AAG AGC GGC ACC GTG GAT TCC CTG GAT GAA ATC CCA CCA CAG AAT AAC AAC GTG
tyr arg lys ser gly thr val asp ser leu asp glu ile pro pro gln asn asn asn val

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Figure 12 contd.

| | |
|---|---|
| 1261/421 | 1291/431 |
| CCA CCT AGG CAA GGC TTT AGC CAT CGC CTG | AGC CAT GTG TCC ATG TTT CGC TCC GGC TTT |
| pro pro arg gln gly phe ser his arg leu | ser his val ser met phe arg ser gly phe |
| 1321/441 | 1351/451 |
| AGC AAT AGC AGC GTG AGC ATC ATC CGC GCT | CCT ATG TTC TCC TGG ATC CAT CGC AGC GCT |
| ser asn ser ser val ser ile ile arg ala | pro met phe ser trp ile his arg ser ala |
| 1381/461 | 1411/471 |
| GAA TTT AAC AAC ATC ATT GCC TCC GAT AGC | ATT ACC CAA ATC CCT GCC GTG AAG GGC AAC |
| glu phe asn asn ile ile ala ser asp ser | ile thr gln ile pro ala val lys gly asn |
| 1441/481 | 1471/491 |
| TTT CTG TTT AAT GGT TCC GTG ATT TCC GGC | CCA GGC TTT ACC GGT GGC GAC CTG GTG CGC |
| phe leu phe asn gly ser val ile ser gly | pro gly phe thr gly gly asp leu val arg |
| 1501/501 | 1531/511 |
| CTG AAT AGC AGC GGC AAT AAC ATT CAG AAT | CGC GGC TAC ATT GAA GTG CCA ATT CAC TTC |
| leu asn ser ser gly asn asn ile gln asn | arg gly tyr ile glu val pro ile his phe |
| 1561/521 | 1591/531 |
| CCA TCC ACC TCC ACC CGC TAC CGC GTG CGC | GTG CGC TAC GCT TCC GTG ACC CCA ATT CAC |
| pro ser thr ser thr arg tyr arg val arg | val arg tyr ala ser val thr pro ile his |
| 1621/541 | 1651/551 |
| CTC AAC GTT AAC TGG GGC AAT TCC TCC ATT | TTT TCC AAT ACC GTG CCA GCT ACC GCT ACC |
| leu asn val asn trp gly asn ser ser ile | phe ser asn thr val pro ala thr ala thr |
| 1681/561 | 1711/571 |
| TCC CTG GAT AAT CTG CAA TCC AGC GAT TTT | GGT TAC TTT GAA AGC GCC AAT GCT TTT ACC |
| ser leu asp asn leu gln ser ser asp phe | gly tyr phe glu ser ala asn ala phe thr |
| 1741/581 | 1771/591 |
| TCC TCC CTG GGT AAT ATC GTG GGT GTG CGC | AAT TTT AGC GGC ACC GCC GGC GTG ATC ATC |
| ser ser leu gly asn ile val gly val arg | asn phe ser gly thr ala gly val ile ile |
| 1801/601 | 1831/611 |
| GAC CGC TTT GAA TTT ATT CCA GTG ACC GCC | ACC CTC GAG TAG GTA |
| asp arg phe glu phe ile pro val thr ala | thr leu glu AMB val |

1261/421
 CCA CCT AGG CAA GGC TCC CAT CGC CTG AGC CAT GTG TCC ATG TCC TCC GGC TTT
 pro pro arg gln gly pro his arg leu ser his val ser met phe ser gly phe
 1321/441
 AGC AAT AGC AGC GTG AGC ATC ATC CGC GCT CCT ATG TTC TCC TGG ATC CAT CGC TCC GCT
 ser asn ser ser val ser ile ile arg ala pro met phe ser trp ile his arg ser ala
 1381/461
 GAG TTC AAC AAC ATC ATC CCG TCC TCC CAA ATC ACC CAA ATC CCG CTC ACC AAG TCC ACG
 glu phe asn asn ile ile pro ser ser gln ile thr gln ile pro leu thr lys ser thr
 1441/481
 AAC CTC GGC TCC GGC ACG TCC GTC GTC AAG GGC CCG GGC TTC ACC GGC GGC gac ATC CTC
 asn leu gly ser gly thr ser val val lys gly pro gly phe thr gly gly asp ile leu
 1501/501
 CGC CGC ACG TCC CCG GGC CAG ATC TCC ACC CTC CGC GTC AAC ATC ACG GCT CCG CTG AGC
 arg arg thr ser pro gly gln ile ser thr leu arg val asn ile thr ala pro leu ser
 1561/521
 CAG CGC TAC AGG GTG CGC ATC AGA TAC GCT AGC ACG ACC AAC CTG CAA TTC CAC ACG TCC
 gln arg tyr arg val arg ile arg tyr ala ser thr thr asn leu gln phe his thr ser
 1621/541
 ATC GAC GGC AGA CCG ATC AAC CAG GGC AAC TTC AGC GCG ACG ATG AGC TCC GGG TCC AAC
 ile asp gly arg pro ile asn gln gly asn phe ser ala thr met ser ser gly ser asn
 1681/561
 CTC CAG TCC GGC TCC TTC CGC ACG GTC GGT TTC ACC ACG CCG TTC AAC TTC TCC AAC GGC
 leu gln ser gly ser phe arg thr val gly phe thr thr pro phe asn phe ser asn gly
 1741/581
 TCC TCC GTC TTC ACG CTC TCC GCT CAT GTC TTC AAC TCC GGC AAC GAG GTG TAC ATC gac
 ser ser val phe thr leu ser ala his val phe asn ser gly asn glu val tyr ile asp
 1801/601
 CGC ATC GAG TTC GTC CCG GCC GAG GTC ACC TTC GAG CTC GAG TAG GTA
 arg ile glu phe val pro ala glu val thr phe glu leu glu AMB val

Figure 13. Nucleotide sequence of synthetic HD1 gene.

1/1
 ATG GAT AAC AAT CCG AAC ATC AAT GAA TGC ATT CCT tac AAT TGC CTC AGC AAC CCT GAA
 Met asp asn asn pro asn ile asn glu cys ile pro tyr asn cys leu ser asn pro glu
 61/21
 GTG GAA GTG CTG GGT GGC GAA CGC ATC GAA ACC GGT TAC ACC CCA ATC GAT ATT TCC CTG
 val glu val leu gly gly glu arg ile glu thr gly tyr thr pro ile asp ile ser leu
 121/41
 TCC CTG ACC CAA TTT CTG CTG AGC GAA TTT GTG CCC GGT GCT GGC TTT GTG CTG GGC CTG
 ser leu thr gln phe leu leu ser glu phe val pro gly ala gly phe val leu gly leu
 181/61
 GTG GAT ATC ATC TGG GGC ATT TTT GGT CCC TCC CAA TGG GAC GCC TTT CTG GTG CAA ATT
 val asp ile ile trp gly ile phe gly pro ser gln trp asp ala phe leu val gln ile
 241/81
 GAA CAG CTG ATT AAC CAA CGC ATC GAA GAA TTC GCT AGG AAC CAA GCC ATT TCC CGC CTG
 glu gln leu ile asn gln arg ile glu glu phe ala arg asn gln ala ile ser arg leu
 301/101
 GAA GGC CTG AGC AAT CTG TAC CAA ATT TAC GCC GAA TCC TTT CGC GAG TGG GAA GCC GAT
 glu gly leu ser asn leu tyr gln ile tyr ala glu ser phe arg glu trp glu ala asp
 361/121
 CCT ACC AAT CCA GCC CTG CGC GAA GAG ATG CGC ATT CAA TTC AAT GAC ATG AAC AGC GCC
 pro thr asn pro ala leu arg glu glu met arg ile gln phe asn asp met asn ser ala
 421/141
 CTG ACC ACC GCT ATT CCT CTG TTT GCC GTG CAA AAT TAC CAA GTG CCT CTG CTG TCC GTG
 leu thr thr ala ile pro leu phe ala val gln asn tyr gln val pro leu leu ser val
 481/161
 TAC GTG CAA GCT GCC AAT CTG CAT CTG TCC GTG CTG CGC GAT GTG TCC GTG TTT GGC CAA
 tyr val gln ala ala asn leu his leu ser val leu arg asp val ser val phe gly gln
 541/181
 AGG TGG GGC TTT GAT GCC GCC ACC ATC AAT AGC CGC TAC AAT GAT CTG ACC AGG CTG ATT
 arg trp gly phe asp ala ala thr ile asn ser arg tyr asn asp leu thr arg leu ile
 601/201
 GGC AAC TAC ACC GAT TAC GCT GTG CGC TGG TAC AAT ACC GGC CTG GAA CGC GTG TGG GGC
 gly asn tyr thr asp tyr ala val arg trp tyr asn thr gly leu glu arg val trp gly
 661/221
 CCA GAT TCC CGC GAT TGG GTG AGG TAC AAT CAA TTT CGC CGC GAA CTG ACC CTG ACC GTG
 pro asp ser arg asp trp val arg tyr asn gln phe arg arg glu leu thr leu thr val
 721/241
 CTC GAT ATC GTG GCT CTG TTC CCA AAT TAC GAT AGC CGC CGC TAC CCA ATT CGA ACC GTG
 leu asp ile val ala leu phe pro asn tyr asp ser arg arg tyr pro ile arg thr val
 781/261
 TCC CAA CTG ACC CGC GAA ATT TAC ACC AAC CCA GTG CTG GAA AAT TTT GAT GGT AGC TTT
 ser gln leu thr arg glu ile tyr thr asn pro val leu glu asn phe asp gly ser phe
 841/281
 CGC GGC TCC GCT CAG GGC ATC GAA CGC AGC ATT AGG AGC CCA CAT CTG ATG GAT ATC CTG
 arg gly ser ala gln gly ile glu arg ser ile arg ser pro his leu met asp ile leu
 901/301
 AAC AGC ATC ACC ATC TAC ACC GAT GCT CAT AGG GGT TAC TAC TAC TGG TCC GGC CAT CAA
 asn ser ile thr ile tyr thr asp ala his arg gly tyr tyr tyr trp ser gly his gln
 961/321
 ATC ATG GCT TCC CCT GTG GGC TTT TCC GGC CCA GAA TTC ACC TTT CCA CTG TAC GGC ACC
 ile met ala ser pro val gly phe ser gly pro glu phe thr phe pro leu tyr gly thr
 1021/341
 ATG GGC AAT GCC GCT CCA CAA CAA CGC ATT GTG GCT CAA CTG GGT CAG GGC GTG TAC CGC
 met gly asn ala ala pro gln gln arg ile val ala gln leu gly gln gly val tyr arg
 1081/361
 ACC CTG TCC TCC ACC CTG TAC CGC CGC CCT TTT AAT ATC GGC ATC AAC AAC CAG CAA CTG
 thr leu ser ser thr leu tyr arg arg pro phe asn ile gly ile asn asn gln gln leu
 1141/381
 TCC GTG CTG GAC GGC ACC GAA TTT GCT TAC GGC ACC TCC TCC AAT CTG CCA TCC GCT GTA
 ser val leu asp gly thr glu phe ala tyr gly thr ser ser asn leu pro ser ala val
 1201/401
 TAC CGC AAG AGC GGC ACC GTG GAT TCC CTG GAT GAA ATC CCA CCA CAG AAT AAC AAC GTG
 tyr arg lys ser gly thr val asp ser leu asp glu ile pro pro gln asn asn asn val